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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/073,012 | 02/12/2002 | Jun Kamatani | 00684.003320 | 6666 |

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| EXAMINER | |
|---|---|
| YAMNITZKY, MARIE ROSE | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1774 | |

DATE MAILED: 11/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/073,012 | KAMATANI ET AL. | |
| | Examiner | Art Unit | |
| | Marie R. Yamnitzky | 1774 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *30 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *48-88* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *48-88* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper ~~No(s)/Mail Date~~ *rec'd 30 Aug 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submissions filed on July 30, 2004 and August 30, 2004 have been entered.

2. Applicant's amendment filed July 30, 2004 amends the specification, cancels claims 1, 3, 8-41 and 43-47, and adds claims 48-88.

Applicant's amendment filed August 30, 2004 amends the specification.

Claims 48-88 are pending.

All rejections set forth in the Office action mailed March 24, 2004 are rendered moot by cancellation of the rejected claims.

3. The amendment filed July 30, 2004 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: The amendment to the paragraph on page 16, line 24-page 17, line 2 setting forth R' as a "3,4,5,6,7,8-hexafluoroisoquinoline group" substituted at a 4- or 5-position.

In the Advisory Action mailed August 10, 2004, the examiner indicated that "3,4,5,6,7,8-hexafluoroisoquinoline" as recited in the amended paragraph bridging pages 16 and 17 is supported by specific compounds such as 454 and 456-459. Upon further consideration, the examiner realized that her previous statement was incorrect.

The paragraph bridging pages 16 and 17 pertains to compounds of formula (8). Formula (8) is: $Ir[Rp\text{-}Ph\text{-}IsoQ\text{-}R'q]_3$. The paragraph currently describes "3,4,5,6,7,8-hexafluoroisoquinoline" as R'. R' is a substituent on IsoQ in formula (8). Accordingly, the paragraph bridging pages 16 and 17 as presently written provides for compounds having a phenylisoquinoline ligand in which the isoquinoline ring structure is substituted at the 4- or 5-position with a 3,4,5,6,7,8-hexafluoroisoquinoline group. Such a compound is not supported by the original disclosure. Compounds 456-459 do not provide support for this subject matter because compounds 456-459 are not compounds of formula (8), nor do they contain an isoquinoline substituted with a hexafluoroisoquinoline. Compound 454 does not provide support for this subject matter because compound 454 is a compound of formula (8) in which IsoQ-R'q as a whole (rather than only R') is a 3,4,5,6,7,8-hexafluoroisoquinoline group.

Applicant is required to cancel the new matter in the reply to this Office Action.

4. Claims 49-56 and 81-88 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Proper antecedent basis is lacking for "the organic compound" as recited in lines 2-3 of claim 49, with claims 50-56 dependent therefrom, and as recited in lines 2-3 of claim 81, with claims 82-88 dependent therefrom. In the indicated phrase, "compound" should be changed to --layer--.

The limitations imposed by the term "main" in the phrase "as a main component" as recited in claims 54 and 86 are not clear. It is not clear if this places any specific numerical limitation on the minimum weight %, volume % or mole % of the host material in the organic layer.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 48-88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Igarashi et al. (US 2001/0019782 A1).

Igarashi et al. disclose iridium coordination compounds for use as light emitting materials in organic electroluminescent devices (e.g. see paragraph [0002]).

Igarashi et al. do not disclose any specific examples of iridium compounds meeting the limitations of the iridium compounds defined/required by the present claims. However, the iridium compounds of the present claims are within the scope of Igarashi's disclosure and

suggested by the teachings of Igarashi et al. For example, see paragraphs [0019]-[0020], [0034]-[0035], [0043]-[0045], [0050], [0063], [0065]-[0074] and [0083].

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make other compounds within the scope of Igarashi's generic formulae and similar to the specific compound disclosed by Igarashi et al. with the expectation that similar compounds would have similar properties and could be used for the purposes of the prior art.

The present compounds are iridium compounds having at least one phenylisoquinoline ligand. In paragraph [0043], Igarashi et al. disclose a phenylisoquinoline derivative as a preferred ligand. Iridium compounds having at least one phenylisoquinoline ligand are encompassed by Igarashi's formula (10) as shown on pages 2 and 5, and Igarashi's formula (20) as shown on page 9. Based on Igarashi's disclosure, one of ordinary skill in the art would have reasonably expected that an iridium compound having three unsubstituted phenylisoquinoline ligands as in present claim 58 would be a light emitting compound suitable for use in an organic electroluminescent device as taught by Igarashi et al.

Further, while Igarashi et al. do not specifically disclose a phenylisoquinoline ligand having the substituent(s) and substitution pattern required for the substituted phenylisoquinoline ligand(s) of the compounds represented by the first, second and fourth-eighth formulae in present claim 48 or the compounds represented by the formulae set forth in present claims 59-80, one of ordinary skill in the art would have reasonably expected that the substituents disclosed in paragraph [0050] could be utilized to provide phenylisoquinoline derivatives suitable for Igarashi's purposes.

One of ordinary skill in the art would have particularly expected alkyl and alkoxy substituents to be suitable substituents for a light emitting iridium compound given the teachings of paragraphs [0043] and [0050] and specific examples of compounds comprising these substituents. For example, Igarashi's compound of formula (1-5) is tris(4-methylphenylpyridine) iridium whereas the compound represented by the formula in present claim 59 is tris(4-methylphenylisoquinoline) iridium. As another example, Igarashi's compound of formula (1-6) is tris(4-methoxyphenylpyridine) iridium whereas the compound represented by the formula in present claim 71 is tris(4-methoxyphenylisoquinoline) iridium. Based on the teachings in paragraph [0043], one of ordinary skill in the art would have reasonably expected that compounds having an isoquinoline ring in place of each of the pyridine rings of the prior art compounds of formulae (1-5) and (1-6) would be light emitting compounds suitable of Igarashi's purposes. Substitution with an alkyl group larger than a methyl group would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention given Igarashi's teachings in paragraph [0050] regarding alkyl groups as substituents. The specific alkyl substituents required by present claims 59-68, 72-74, 76 and 78-80 are within the scope of the particularly preferred alkyl groups taught by Igarashi in paragraph [0050].

One of ordinary skill in the art also would have expected that a phenyl group could be used as a substituent, as in the compound represented by the formula set forth in present claim 69, given Igarashi's teaching in paragraph [0050] that a phenyl group can be used as a substituent. Phenyl groups are used as substituents on the phenyl ring of the phenylpyridine ligands of the prior art compounds of formulae (1-42) and (1-45).

One of ordinary skill in the art also would have expected that a phenyloxy group could be used as a substituent, as in the compound represented by the formula set forth in present claim 70, given Igarashi's teaching in paragraph [0050] that a phenyloxy group can be used as a substituent.

With respect to compounds represented by the fourth-eighth formulae set forth in present claim 48, one of ordinary skill in the art at the time of the invention would have reasonably expected that compounds having three isoquinoline-containing ligands wherein at least one, but not all, of the ligands contain a substituent would be light-emissive compounds suitable for use in organic electroluminescent devices since Igarashi et al. teach isoquinoline-containing ligands, teach substitution of ligands, and teach that the ligands of the iridium compounds need not be identical.

With respect to the compounds represented by the first and second formulae in claim 48, Igarashi teaches in paragraph [0044] that the iridium compounds may have a diketone ligand. Diketone ligands of the structure required by the first two formulae in claim 48 are suggested by the diketone ligand depicted on page 20 of the reference. One of ordinary skill in the art would have reasonably expected that a diketone ligand usable in combination with a phenylquinoline ligand as in the formula on page 20 could also be used in combination with a phenylisoquinoline ligand.

With respect to the compound represented by the third formula in claim 48, Igarashi's compound of formula (1-56) on page 15 is similar to this compound. The present compound has one phenylisoquinoline ligand and two phenylpyridine ligands whereas the prior art compound

has two phenylisoquinoline ligands and one phenylpyridine ligand. Given Igarashi's teachings as a whole, one of ordinary skill in the art would have reasonably expected that compounds having the same ligands in different ratios would have similar properties and could be used for the same purpose.

7. Claims 48-88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwong et al. (US 2003/0072964 A1).

Kwong's compound of formula III as defined, for example, in claims 1 and 68 of Kwong's published application encompasses compounds represented by the formulae set forth in the present claims. Kwong's compounds are disclosed for use as an emissive material in an organic electroluminescent device. As defined in Kwong's claims 1 and 68, the phenyl and/or the isoquinoline group of the phenylisoquinoline ligand(s) may be substituted. Suitable substituents include alkyl, alkoxy, aryl and aryloxy groups. Also see paragraphs [0072]-[0073], [0133]-[0136], [0166] and [0171]-[0173].

In addition to one or more phenylisoquinoline ligands, Kwong's compound of formula III may comprise another bidentate ligand. The phenylpyridine ligand required by the compound represented by the third formula in present claim 48 is suggested, for example, by the first formula in Kwong's claim 17, and the diketone ligands required by the compounds represented by the first two formulae in present claim 48 are suggested, for example, by Kwong's claim 14. Also see paragraph [0158].

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make various compounds within the scope of Kwong's compounds of formula III in order to provide various compounds other than those explicitly disclosed by Kwong et al. for use in an organic electroluminescent device. One of ordinary skill in the art at the time of the invention would have reasonably expected that compounds within the scope of Kwong's compound of formula III having substituents selected from those suggested by Kwong et al. would have be light emissive compounds and would be suitable for use in an organic electroluminescent device as taught by Kwong et al. One of ordinary skill in the art at the time of the invention would have reasonably expected that the wavelengths of light emitted by an iridium compound having at least one phenylisoquinoline ligand could be altered by appropriate selection of substituents and substitution patterns guided by the teachings of Kwong et al.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

8. Applicant's arguments filed July 30, 2004 have been fully considered but they are not persuasive with respect to the patentability of the present claims over the prior art. It is the examiner's position that the compounds required/defined by the present claims are suggested by the prior art, and the claimed device and display panel comprising one of the compounds suggested by the prior art would have been obvious to one of ordinary skill in the art at the time of the invention.

9. Miscellaneous:

In the amendment filed August 30, 2004, applicant deleted the entry for compound 398 from Table 12-1 because compound 398 is the same as compound 270. Table 12-1 is continued to Table 12-2. The entry for compound 398 should also be deleted from Table 12-2.

It has come to the examiner's attention that the publication of the present application (Pub. No. US 2003/0068526 A1) is missing several tables (6-2, 7-2, 8-2, 9-2, 10-2, 11-1, 12-2 and 14-2B). This is brought to applicant's attention in case republication is desired. Unfortunately, the time period for requesting republication under 37 CFR 1.221(b) has passed. If republication is desired, the request must be made under 37 CFR 1.221(a). See MPEP 1130.

10. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax number for Art Unit 1774 is (703) 872-9306 for all official faxes. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY
November 15, 2004

Marie R. Yamnitzky

MARIE YAMNITZKY
PRIMARY EXAMINER

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